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Smart Structure and Attitude Control Laboratory

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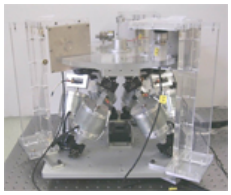
This testbed is used for structural dynamics and controls research. Providing a scaled laboratory model of the International Space Station structure, the overall dimensions of the NPS Space Truss is 3.76 m long, 0.35 m wide and 0.7 m tall. Two piezoceramic struts are installed as actuators near the base of the truss. The output force for the actuator is 0-100 N and the displacement range is 0-90 μm. A linear proof mass actuator, located at one end of the truss, can be used to generate structural disturbances.



The Positioning Hexapod is used to research control algorithms for vibration isolation of an imaging payload and fine steering of the payload boresight. Six electromagnetic voice coil actuators employ in-line accelerometers for control of high frequency vibrations. Lower frequency boresight steering and vibration isolation is achieved using a laser photo-diode 2-axis position detector and eddy current position sensors. The system can deliver over 5.7 mm of axial travel, 20 mm of lateral motion, 2.5 degrees of platform tilt and 10 degrees of platform rotation.

The Flexible Spacecraft Simulator (FSS) simulates a single axis rotational spacecraft with flexible space structures. FSS utilizes planar air-pads to create frictionless rotational motion. FSS has been successfully used to demonstrate various control techniques for large slew maneuvers.